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*Indian Standard*

METHODS OF TEST FOR AUTOCLAVED  
CELLULAR CONCRETE PRODUCTS

**PART IV CORROSION PROTECTION OF STEEL  
REINFORCEMENT IN AUTOCLAVED CELLULAR CONCRETE**

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**BUREAU OF INDIAN STANDARDS**  
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NEW DELHI 110002

*Indian Standard***METHODS OF TEST FOR AUTOCLAVED  
CELLULAR CONCRETE PRODUCTS****PART IV CORROSION PROTECTION OF STEEL  
REINFORCEMENT IN AUTOCLAVED CELLULAR CONCRETE**

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*(Continued on page 7)*

*Indian Standard***METHODS OF TEST FOR AUTOCLAVED  
CELLULAR CONCRETE PRODUCTS****PART IV CORROSION PROTECTION OF STEEL  
REINFORCEMENT IN AUTOCLAVED CELLULAR CONCRETE****0. F O R E W O R D**

**0.1** This Indian Standard (Part IV) was adopted by the Indian Standards Institution on 21 February 1972, after the draft finalized by the Cement and Concrete Sectional Committee had been approved by the Civil Engineering Division Council.

**0.2** Autoclaved cellular concrete is a class of material, which has been developed commercially abroad and is in the process of development in this country also. A series of Indian Standards on cellular concrete is being formulated so as to provide guidance in obtaining reliable products in autoclaved cellular concrete. The Sectional Committee has considered it desirable to issue a standard for the methods of test for autoclaved cellular concrete products for the guidance of manufacturers and users.

**0.3** In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country.

**0.4** For convenience of reference, 'Indian Standard methods of test for autoclaved cellular concrete products' has been grouped into the following nine parts:

- |          |   |
|----------|---|
| Part I   | Determination of unit weight or bulk density and moisture content                                     |
| Part II  | Determination of drying shrinkage   |
| Part III | Determination of thermal conductivity   |
| Part IV  | Corrosion protection of steel reinforcement in autoclaved cellular concrete                           |
| Part V   | Determination of compressive strength   |
| Part VI  | Strength, deformation and cracking of flexural members subject to bending-short duration loading test |
| Part VII | Strength, deformation and cracking of flexural members subject to bending-sustained loading test      |

Part VIII Loading tests for flexural members in diagonal tension

Part IX Jointing of autoclaved cellular concrete elements

**0.5** In reporting the result of a test made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2 - 1960\*.

## **1. SCOPE**

**1.1** This standard ( Part IV ) covers the method for determining the effectiveness of corrosion protection of the reinforcement bars embedded in autoclaved cellular concrete. In this method of test the effectiveness of corrosion protection of reinforcement bars is determined by exposure of samples to humid conditions at two widely different temperatures alternatively. The method is an accelerated test for corrosion under conditions, which are as close as possible to those experienced in practice.

## **2. TEST SPECIMENS**

**2.1 Location of Specimens** — Three test specimens shall be cut from a complete element of the autoclaved cellular concrete product taken from the current production after exposure to the designed load. The specimens shall preferably be evenly distributed over the whole width of the element; the position of the test specimens is illustrated in Fig. 1.

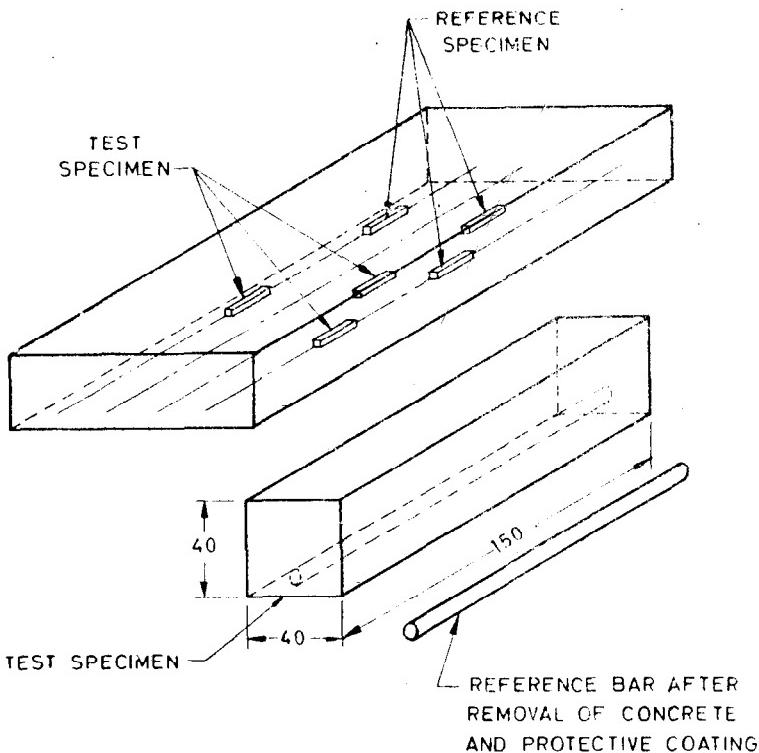
**2.2 Shape and Size of Test Specimens** — The test specimens shall be  $40 \times 40 \times 150$  mm prisms with the steel bar positioned centrally in the prisms. The specimens shall be prepared by careful sawing. The end faces ( $40 \times 40$  mm) of the prisms shall be coated with a moisture and vapour barrier, such as cold asphalt or bitumen emulsion layer coated with a layer of melted asphalt.

**2.3 Reference Samples** — For each of the test specimen there shall be a reference specimen of the same size as the test specimen and cut from the same reinforcement bar and from a position adjacent to the test specimen ( see Fig. 1 ). Thus there shall be three test specimens, cut and treated as in **2.1** and **2.2** and three corresponding reference specimens. For reference samples, the concrete around the steel bar and the protective coating on the surface of the bar shall be crushed and removed until the whole surface of the steel bar can be visually inspected and classified according to **4.1**.

## **3. TESTING EQUIPMENT**

**3.1** Climatic cabinet where the specimens can be exposed to moisture-saturated air ( relative humidity  $90 \pm 5$  percent ) at temperatures alternating every 3 h between  $25 \pm 5^\circ\text{C}$  and  $55 \pm 5^\circ\text{C}$ , with warming-up period of one hour for each temperature.

\*Rules for rounding off numerical values ( revised ).



All dimensions in millimetres.

FIG. 1 TEST SPECIMENS AND REFERENCE SPECIMENS FOR CORROSION PROTECTION OF STEEL REINFORCEMENT

#### 4. PROCEDURE

**4.1 Inspection of Reference Samples** — Immediately after preparation of the reference samples, the whole surface of the steel bars shall be examined from all sides and the amount of rust present on the surface noted.

**4.2 Rust Exposure of Test Specimens** — The three test specimens shall be placed in the humidity cabinet and exposed to moisture-saturated air at  $25 \pm 5^\circ\text{C}$  and  $55 \pm 5\%$ . Every 24 h the specimens shall be exposed to four cycles with each cycle consisting of 3 h at  $25 \pm 5^\circ\text{C}$  and 3 h at  $55 \pm 5\%$ .

**4.2.1** After 28 days exposure of the specimens in the humidity cabinet, the cellular concrete material around the reinforcement bars and coating on the bars shall be removed, and the surface of the bars examined in the same fashion in which the reference samples have been examined.

**4.3 Assessing Corrosion** — The corrosion (or the efficacy of rust protecting agent) of test specimen bars shall be estimated by comparing with reinforcement bars of corresponding reference specimens. When the assessment is made the bars shall be rotated around their longitudinal axis so that the entire surface is checked. If reinforcing bars of the test specimens are free from rust or show only slight rust (not rust flakes) distributed uniformly over the bars and do not occupy more than 5 percent of its surface, the rust protecting agent is considered satisfactory.

## **5. REPORT**

**5.1** The report shall include the following information:

- a) Code designation;
- b) Place, time and method of sampling; and
- c) Percentage of rust formation.

(Continued from page 2)

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